

REMARKS

With entry of this amendment, claims 3-5, 8-11, 14-16, 19-22, 25-27, and 30-33 have been cancelled, and claims 34-57 have been added, resulting in the pendency of claims 1, 2, 6, 7, 12, 13, 17, 18, 23, 24, 28, 29, and 34-57. Based on the foregoing amendments and following remarks, reconsideration and allowance of this application is respectfully requested.

Claim Rejections-35 U.S.C. §102

Smits

Claims 1-3, 5-14, 16-25, and 27-33 stand rejected under 35 U.S.C. §103, as being obvious over U.S. Patent No. 6,631,444 to Smits et al. (“Smits”). Without acquiescing that Smits is a §102(e) prior art reference, and without prejudice to antedate this reference should it be necessary, Applicant makes the following comments. Claims 3, 5, 8-11, 14, 16, 19-22, 25, 27, and 30-33 have been cancelled, thereby rendering the rejections of these claims moot. As for the remaining claims 1, 2, 6, 7, 12, 13, 17, 18, 23, 24, 28, and 29, Applicant respectfully traverses this rejection, since Smits does not disclose, teach, or suggest the combination of elements required by these claims, as amended.

In particular, independent claims 1, 12, and 23 have been amended to require “automatically modifying a number of clocked elements in the one or more pipeline locations of the design.” In contrast, although Smits discloses inserting clocked elements into pipelined locations of a circuit design, such clocked element insertion is not disclosed as being performed automatically.

In fact, because Smits inserts such clocked elements into a cache memory architecture, there is no motivation or apparent benefit to automate the Smits clocked element insertion methodology. That is, cache memory architectures are relatively simple circuits composed of large arrays of

repetitions of simple elements. Because they are simple, regular, and of limited function, the effects of clocked element insertion is easy to predict, and thus all aspects of the clocked element insertion can be manually accomplished relatively easily. Also, the clocked elements must be inserted into the cache memory architecture in a very regular pattern, and thus, only a few such patterns are available to the designer.

In contrast, the inventors were posed with the problem of inserting clocked elements within a general circuit architecture where the effects of clocked element insertion are not easily predicted. For example, some clocked elements will not help at all, some will help a lot, and some will not help unless others are changed as well. It is difficult to determine the number of clocked elements to be inserted at pipelined locations without adversely affecting circuit functionality. There are many different possibilities (perhaps 10s of millions) as opposed to the very few that are available in a memory cache architecture. With a cache memory architecture, a designer could very reasonably look at all possible solutions, whereas for arbitrary logic, such as that found in general circuit architectures, manual clocked element insertion is very intensive. Thus, the efficient and effective insertion of clock elements into a general circuit architecture presents a much more difficult problem than that presented by the memory cache disclosed in Smits, and one that has not yet been solved satisfactorily, as discussed in paragraphs [0004]-[0007] of the current application.

In sum, Smits does not disclose the claimed automated modification of a number of clocked elements at one or more specified pipelined locations, and there is no suggestion in Smits to do so. Thus, Applicant submits that independent claims 1, 12, and 23, as well as the claims depending therefrom (claims 2, 6, 7, 13, 17, 18, 24, 28, and 299) are not obvious over Smits, and as such, respectfully request withdrawal of the §103 rejections of these claims.

Smits and DiGiacomo

Claims 4, 15, and 26 stand rejected under 35 U.S.C. §103, as being obvious over Smits in view of U.S. Patent No. 4,630,219 to DiGiacomo et al. ("DiGiacomo"). Claims 4, 15, and 26 have been cancelled, thereby rendering the rejections of these claims moot.

New Claims

Applicant submits that newly added claims 34-57 find support in the specification, as originally filed, and are patentable over the cited prior art for at least the same reason as independent claims 1, 12, and 23 from which they depend.

Conclusion

Based on the foregoing, it is believed that, with entry of this amendment, all claims are now allowable and a Notice of Allowance is respectfully requested. If the Examiner has any questions or comments regarding this amendment, the Examiner is respectfully requested to contact the undersigned at (714) 830-0600.

Respectfully submitted,


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